what the author says on this point:—"Gravity is regarded as . . . . an original property of a body belonging to it of itself. Descartes denies it. Therein consists the opposition between Galileo and Descartes; with gravity he was obliged to reject gravitation and the power of attraction. Therein consists the subsequent opposition of Newton and Descartes; he is, therefore, compelled to deny the so-called central forces, as well as every *actio in distans*."

The two essential pre-suppositions of his hypothesis are the "immeasurableness of the universe and the nullity of empty space. From the first it follows that the universe is not a spherical body, and does not consist in concentric spheres to which the stars are fastened; that there is, therefore, no celestial sphere beyond the farthest planet (Saturn), and that the sun does not lie in the same spherical superficies. From the second, it follows that the spaces of the heavens are filled with fluid matter, and that the heavenly bodies are surrounded by the latter, and subject to its influences."

Descartes supposes the earth to be completely surrounded by this fluid, and "acted upon uniformly in every direction, or carried along by its current, as a solid body in liquid matter. The planets follow also the same rule. Each is at rest in the heavens in which it is, and all the change of place which we observe in those bodies follows from the motion of the matter of the heavens which surrounds them on all sides."

By supposing, again, that this flow of the matter, which surrounds the earth and planets, describes a current "spinning round like a vortex," with the sun in the centre and the earth and planets going round it; he obtains, without considering their weight and attraction, a method by means of which their various motions may be explained. He compares this "vortex" motion of the matter with eddies of water, "as waters when they are forced to a reflux form an eddy, and draw violently within their rotary motion, and carry along with them, light floating bodies, as, for example, straws; as then these bodies, seized by the eddy, turn about their own centre, and those nearer the centre of the eddy always complete their rotation earlier than the more distant ones; as, finally, this eddy always, to be sure, describes a circular figure, but almost never a perfect circle, but extends itself, now more in length and now in breadth, wherefore the parts at the periphery are not equally distant from the centre,—so one can easily see that the motion of the planets is of the same character, and that no other conditions are necessary to explain all their phenomena."

Thus Descartes agrees with Copernicus and Galileo with regard to the heliocentric motion of the earth and planets, although basing his hypothesis on different mechanical laws; he also teaches that the earth is a planet, and rotates on its axis daily, and revolves yearly in an elliptical orbit round the sun.

The author then tells us how Descartes, after the completion of his hypothesis, postponed its publication, on account of the fate of Galileo, and how he (Descartes) expressly stated at the end that "his hypothesis not only may be, but in certain respects is, false." Although he denied the movement of the earth, it was only in a sense that followed from his idea of motion which he applied to the heavenly bodies; for, with reference to the other bodies in the heavens, it does move, but is at rest in relation to the fluid matter around it, or, as the author says, "it moves exactly as a man who is asleep in a ship, while it takes him from Dover to Calais."

In conclusion, we must add that the work of both translator and editor has been honestly done, though, as the above quotation shows, the style of the translator is susceptible of improvement, and that this volume will form a valuable addition to the libraries of students of moral philosophy. To the readers of such a work as this, consisting as it does of so many historical facts, an index is imperative, and we hope in future editions to see one inserted. W. J. L.

A TEXT-BOOK OF ORGANIC CHEMISTRY.

A Text-book of Organic Chemistry. By A. Bernthsen, Ph.D., formerly Professor of Chemistry in the University of Heidelberg. Translated by George McGowan, Ph.D., Demonstrator in Chemistry, University College of North Wales, Bangor. (London: Blackie and Son, 1889.)

THIS work furnishes an excellent elementary account of the principles of organic chemistry. An introduction treating of the general theory of organic compounds, including the subjects of constitution, isomerism, physical properties, &c., is followed by the detailed description of the various classes of compounds and their relations to one another, the fatty compounds being first discussed, and then those belonging to the group of aromatic substances and to the pyridine group. The treatment of the various compounds in "series," all the hydrocarbons of the fatty series—paraffins, olefines and acetylenes—being, for example, fully described before any of their halogen derivatives or of the alcohols are discussed, cannot be commended from the point of view of the novice to the science, for whom the book is avowedly designed. This evil is, however, largely compensated for in the present work by the clear language invariably employed, and more especially by the frequent introduction of semi-diagrammatic tables showing the connection between various related series, such, for example, as the glycols, hydroxy-acids and dibasic acids.

The description of the aromatic compounds, prefaced by a short account of the benzene theory, is grouped about the typical hydrocarbons, benzene and its derivatives being first treated, then diphenyl with its derivatives, triphenyl-methane and its group, naphthalene, &c. Mere description of compounds is sternly and consistently avoided, its place being supplied, whenever possible, by tabulated statements, showing at a glance both the chemical and physical relations of a whole series of derivatives. These tables are a distinguishing feature of the book, and impart to it a clearness and conciseness which will render it welcome to every student.

Abundant references are provided to the original papers concerning subjects which fall without the elementary scope of the work, such as, among many others, the diazo-derivatives of the fatty series, the syntheses of glucosides, and the grouping of atoms in space, which last is treated in language which will perhaps be apt to mislead, and scarcely receives a degree of attention commensurate with its importance.

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The translator has performed his work with great success, and he is to be congratulated on the almost complete absence of printers' errors, which so often mar the pages of works of this class. It is to be regretted that he has in some instances neglected to adopt the nomenclature employed by the Chemical Society, since uniformity of usage in this respect is greatly to be desired. An excellent index forms a fitting conclusion to the work, which is sure to take as high a place among the elementary text-books of organic chemistry in the English language as it has already done in the Fatherland.

OUR BOOK SHELF.

The Viking Age; the Early History, Manners, and Customs of the Ancestors of the English-speaking Nations. By Paul B. Du Chaillu. Two Vols. 1366 Illustrations, and Map. (London: Murray, 1889.)

THE author of this work has persuaded himself that the invaders who conquered and settled in Britain after the departure of the Romans were not, as we have been taught to believe, Low Dutch tribes, but Norsemen. It is unfortunate that he should have hampered himself in his researches by so arbitrary a theory. Of course, no one disputes that there is a strong Scandinavian element in England; the fact has always been perfectly well understood by historians, and has received from them due attention. But to say that the English people are wholly or mainly descended from Scandinavians is to advance a proposition opposed to all the most vital evidence we possess on the subject. The evidence of language alone would suffice to dispose of so crude a doctrine. Mr. Du Chaillu has not approached the consideration of the question in a scientific spirit, and has too lightly brushed aside the difficulties in his way.

He has tried to give an account of the ideas, customs, manners, and institutions of the ancient Scandinavians; and we need scarcely say that there are some lively and attractive passages in his chapters on these subjects. From his book, English anthropologists will learn that there is valuable material for them in the old northern laws and Icelandic Sagas. They will, however, be unable to make use of his translated extracts, because he does not attempt to estimate the date and weight of the documents used, late forged Sagas being treated precisely as authentic early poems or contemporary histories.

The work has, in fact, no scientific value. It will amuse "the general reader," but it is unsuitable for serious students. To the archæologist it may serve as a rough index to the chief finds made in the three Scandinavian countries; but even for this purpose he will need to refer to the original plates and cuts from which the illustrations in these volumes are more or less happily reproduced. This will be obvious to anyone who studies the originals in the papers of Montelius, the Proceedings of the Stockholm Congress, 1874, the splendid Copenhagen Museum Catalogues, or the "Aarbφger for Nordisk Old-kyndighed og Historie." F. Y. P.

A Glossary of Anatomical, Physiological, and Biological Terms. By T. Dunman. Second Edition. Edited, and supplemented with an Appendix, by W. H. Wyatt Wingrave, M.R.C.S. (London: Griffith, Farran, Okeden, and Welsh.)

IT is now eleven years since the first edition of this book appeared. The senior author outlived its publication by but a short period. The editor of the present edition has left its pages unaltered, and has taken upon himself to add thereto (in the form of an appendix) twenty-five pages, embracing some 400 physiological and morphological terms, to the paucity of which, in the original edition, he directs attention. Many of his supplementary words are superfluous, others are obsolete, and by no means a few are either insufficiently or inaccurately explained. The original edition was by no means free of like defects: in it we read, by way of example, that the "*Sepiostaire*" is "the only representative of an endoskeleton in the cuttle-fishes"; that the "*Septum lucidum*" is "the partition which separates from each other the lateral ventricles of the brain"; that by "*Schizocœle*" is meant "a term applied to the peri-visceral cavity of the Invertebrata, when formed by a splitting of the mesoblast of the embryo." The present editor, while preserving the above and many other similar misstatements, has, in turn, shown himself wanting in power of accurate definition of fundamentals. This is seen, for example, in his renderings of "*Endomysium*," "*Inhibition*" (defined as "checking or controlling influence, exercised by a nerve-centre over some subordinate organ or process"), "*Metabolism*," "*Meckelian bar*," and *Negative variation*" (which, we are told, embraces "changes in the natural nerve or muscle currents which occur during contraction"). The little volume has hitherto recommended itself to students chiefly by its compactness. There has always characterized it a want of expressiveness and of finish. A single instance will suffice: "*Glomerulus*" has all along stood, and still stands, as "the small ball of capillaries in the Malpighian capsules of the kidney." It is the first duty of an editor of a new edition to rectify original defects; and, until that shall have been done, he has no right to add supplementary matter. The volume, as it now stands, must be speedily revised, if the recommendation of experienced teachers is to be looked for; and it is upon the same that it can alone maintain its honoured position.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Acquired Characters and Congenital Variation.

BEING one of those who do not believe that either the theory of Darwin or the theory of Lamarck gives any adequate or rational account of the "origin of species," I am always glad to see any controversy which pits the one of them against the other. It is by such controversy that the weak points of each are best exposed. But I now write in the interests of peace and conciliation. Prof. Ray Lankester seems to me to be much too belligerent. I see no necessary antagonism between "congenital variation" and the transmission of "acquired characters." If an acquired character affects the whole organism, and especially the reproductive elements, then its hereditary transmission would perfectly reconcile the two conceptions. And this is probably the universal fact. I have no doubt of the hereditary transmission of acquired characters. So far is it from being "unproved," it is consistent with all observation and all experience. It lies at the foundation of all organic development. But it implies no denial of "congenital" causes. It is very probable that every "acquired character" is necessarily correlated with some physical modifications in organic structure, and that it is only transmitted to progeny through, and by means of, this physical modification.

This being so, the question arises, Why is it that the idea of acquired characters becoming hereditary is so fiercely opposed by extreme Darwinians? Is it the mere jealousy of an exclusive worship—the mere dislike of the great name of Lamarck being mentioned, even in the same day, with the name of Darwin? It is partly this, no doubt. But it is something more. It is jealousy of any conception which tends to break down the empire of mere fortuity in the phenomena of variation. Darwin himself is not wholly responsible for this feeling. He expressly guarded himself against the interpretation which has been affixed to his language about "accidental" variation. He knew well

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